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Memo

DATE: *December 14, 2001*

TO: RHIC E-Coolers

FROM: *Ady Hershcovitch*

SUBJECT: **Minutes of the December 14, 2001 Meeting**

Present: Ilan Ben-Zvi, Michael Harrison, Ady Hershcovitch, Jorg Kewisch, Derek Lowenstein, William MacKay, Satoshi Ozaki, Stephen Peggs, Dejan Trbojevic, Dong Wang, Jie Wei, Vitaly Yakimenko.

Topics discussed: AES SBIR Phase I progress. SBIR Phase II proposal.

Ilan presented a summary of a December 11th, 2001 meeting held at Advanced Energy Systems, Inc. (AES). Dong, Triveni Rao, Eugene Hu, and Marty Woodle joined Ilan. At the meeting progress of the AES SBIR Phase I titled "CW L-Band Water Cooled Photocathode Electron Gun" was discussed. To begin with, Ilan indicated that originally cryogenic cooling was envisioned for the gun. However, Mike Iarocci pointed out that the cost of a cryogenic refrigerator would be about $1M.

Substantial progress was made rapidly. Phase I of the project started at the beginning of September 2001. Completion date for this phase is anticipated to be February 26th, 2002, well ahead of the March 25th, 2002 deadline for phase II proposal submission. Gun design is based on a 1.6 cell that was scaled from 2.856 GHz MIXS BNL gun, to which an additional full cell was added. Hence, the model is a 2.6 cell gun with flat fields. The cathode field was set to 15 MV/cm. RF analysis was performed with the SUPERFISH code. Total power deposition is about 800 kW, with 434 W/cm^2 at the hottest spot. Cooling channel system was designed. Required water flow rate is 17.3 liter/second. Baseline design includes the BNL designed cathode preparation chamber. In answer to Waldo's question, needed gun temperature control is within 0.5 K.

Satoshi raised the issue of cathode lifetime. With a hot cathode it is difficult to maintain a good vacuum, and therefore cathode poisoning results in a short lifetime. Ilan's answer is that 4 hours is the expected lifetime. Cathode preparation is 2 hours and a switch over of 10 – 15 minutes. Los Alamos and Boeing have significant experience with cathode poisoning (mostly due to CO_2 and water vapor).

Derek, Mike, and Satoshi raised the issue of BNL input to the SBIR phase II proposal (cathode info), and the need for a theme consistent with RHIC II.